

SEQUENCE LISTING

<110> FISCHHOFF, DAVID A.
FUCHS, ROY L.
LAVRIK, PAUL B.
MC PHERSON, SYLVIA A.
PERLAK, FREDERICK J.

<120> COLEOPTERAN TOXIN PROTEINS OF BACILLUS THURINGIENSIS

<130> MOBT:195--1

<150> 09/027,998
<151> 1998-02-23

<160> 54

<170> PatentIn version 3.1

<210> 1
<211> 2615
<212> DNA
<213> Artificial Sequence

<220>
<223> Chimeric toxin gene

<400> 1
gagcgactat tataatcata catatttctt attggaatga ttaagattcc aatagaatag 60
tgtataaaattt atttatcttg aaaggaggga tgcctaaaaa cgaagaacat taaaaacata 120
tatttgcacc gtctaatttga tttatgaaaa atcattttat cagtttgaaa attatgtattt 180
atgataagaa agggaggaag aaaaatgaat ccgaacaatc gaagtgaaca tgatacaata 240
aaaactactg aaaataatga ggtgccaaact aaccatgttc aatatccttt agcggaaact 300
ccaaatccaa cactagaaga tttaaattt aaagagttt taagaatgac tgcagataat 360
aatacggaaag cactagatag ctctacaaca aaagatgtca ttcaaaaagg catttccgtt 420
gtaggtgatc tcctaggcgt agtaggtttc ccgtttggtg gagcgcttgc ttcttttat 480
acaaactttt taaatactat ttggccaagt gaagaccgtt ggaaggctt tatggaacaa 540
gtagaagcat tgatggatca gaaaatagct gattatgcaa aaaataaagc tcttgcagag 600
ttacagggcc ttcaaaataa tgtcgaagat tatgtgagtg cattgagttc atggcaaaaa 660
aatcctgtga gttcacgaaa tccacatgc caggggcgga taagagagct gtttctcaa 720
gcagaaaagtc atttcgtaa ttcaatgcct tcgtttgcaa tttctggata cgagggttcta 780
tttctaacaa catatgcaca agctgccaac acacattttt ttttactaaa agacgctcaa 840
atttatggag aagaatgggg atacgaaaaa gaagatatttgc ttcaattttta taaaagacaa 900

ctaaaactta cgcaagaata tactgaccat tgtgtcaa at ggtataatgt tggattagat 960
aaattaagag gttcatctta tgaatcttgg gttaaacttta accgttatcg cagagagatg 1020
acattaacag tattagattt aattgcacta tttccattgt atgatgttcg gctataccca 1080
aaagaagtta aaaccgaatt aacaagagac gtttaacag atccaattgt cgaggtaac 1140
aaccttaggg gctatggaac aacccctctct aatataaaaa attatattcg aaaaccacat 1200
ctatttgact atctgcatac aattcaattt cacacgcgtt tccaccagg atattatgga 1260
aatgactctt tcaattattt gtccggtaat tatgtttcaa ctagaccaag cataggatca 1320
aatgatataa tcacatctcc attctatgga aataaatcca gtgaacctgt acaaaattta 1380
gaatttaatg gagaaaaaagt ctatagagcc gtagcaaata caaatcttgc ggtctggccg 1440
tccgctgtat attcaggtgt tacaaaagtg gaatttagcc aatataatga tcaaacagat 1500
gaagcaagta cacaacgta cgactcaaaa agaaatgttgc gcgcggcgtcag ctgggattct 1560
atcgatcaat tgccctccaga aacaacagat gaacctctag aaaagggata tagccatcaa 1620
ctcaattatg taatgtgcct tttaatgcag ggttagtagag gaacaatccc agtgttaact 1680
tggacacata aaagtgtaga cttttttaac atgattgatt cgaaaaaaat tacacaactt 1740
ccgttagtaa aggcatataa gttacaatct ggtgcttccg ttgtcgccagg tcctaggtt 1800
acaggaggag atatcattca atgcacagaa aatggaagtgc ggcaactat ttacgttaca 1860
ccggatgtgt cgtactctca aaaatatcga gctagaatttcc attatgcttc tacatctcag 1920
ataacattta cactcagttt agacggggca ccatttaatc aatactattt cgataaaacg 1980
ataaataaaag gagacacatt aacgtataat tcatttaatt tagcaagttt cagcacacca 2040
ttcgaattat cagggataaa cttacaaataa ggcgtcacag gattaagtgc tggagataaa 2100
gtttatatac acaaaatttgc atttatttccat gtgaattttaa ttaacttagaa agtaaagaag 2160
tagtgaccat ctatgatagt aagcaaagga taaaaaaatg agttcataaa atgaataaca 2220
tagtgttctt caactttcgc ttttgaagg tagatgaaga acactatttt tattttcaaa 2280
atgaaggaag ttttaatat gtaatcattt aaaggaaaca atgaaagttag gaaataagtc 2340
attatctata acaaaataaac cattttataa tagccagaaa tgaattataa tattaatctt 2400
ttctaaatttgc acgttttctt aaacgttcta tagcttcaag acgtttagaa tcattcaat 2460
ttgtatacag agctgttgc tccatcgagt tatgtcccat ttgattcgct aatagaacaa 2520
gatctttattt ttcgttataa tgattgggttgc cataagtatg gcgttaattta tgagggcttt 2580
tctttcatc caaaagccaa gtgtatttctt ctgtta 2615

<210> 2
<211> 644
<212> PRT
<213> Artificial Sequence

<220>
<223> Chimeric toxin

<400> 2

Met Asn Pro Asn Asn Arg Ser Glu His Asp Thr Ile Lys Thr Thr Glu
1 5 10 15

Asn Asn Glu Val Pro Thr Asn His Val Gln Tyr Pro Leu Ala Glu Thr
20 25 30

Pro Asn Pro Thr Leu Glu Asp Leu Asn Tyr Lys Glu Phe Leu Arg Met
35 40 45

Thr Ala Asp Asn Asn Thr Glu Ala Leu Asp Ser Ser Thr Thr Lys Asp
50 55 60

Val Ile Gln Lys Gly Ile Ser Val Val Gly Asp Leu Leu Gly Val Val
65 70 75 80

Gly Phe Pro Phe Gly Gly Ala Leu Val Ser Phe Tyr Thr Asn Phe Leu
85 90 95

Asn Thr Ile Trp Pro Ser Glu Asp Pro Trp Lys Ala Phe Met Glu Gln
100 105 110

Val Glu Ala Leu Met Asp Gln Lys Ile Ala Asp Tyr Ala Lys Asn Lys
115 120 125

Ala Leu Ala Glu Leu Gln Gly Leu Gln Asn Asn Val Glu Asp Tyr Val
130 135 140

Ser Ala Leu Ser Ser Trp Gln Lys Asn Pro Val Ser Ser Arg Asn Pro
145 150 155 160

His Ser Gln Gly Arg Ile Arg Glu Leu Phe Ser Gln Ala Glu Ser His
165 170 175

Phe Arg Asn Ser Met Pro Ser Phe Ala Ile Ser Gly Tyr Glu Val Leu
180 185 190

Phe Leu Thr Thr Tyr Ala Gln Ala Ala Asn Thr His Leu Phe Leu Leu
195 200 205

Lys Asp Ala Gln Ile Tyr Gly Glu Glu Trp Gly Tyr Glu Lys Glu Asp
210 215 220

Ile Ala Glu Phe Tyr Lys Arg Gln Leu Lys Leu Thr Gln Glu Tyr Thr
225 230 235 240

Asp His Cys Val Lys Trp Tyr Asn Val Gly Leu Asp Lys Leu Arg Gly
245 250 255

Ser Ser Tyr Glu Ser Trp Val Asn Phe Asn Arg Tyr Arg Arg Glu Met
260 265 270

Thr Leu Thr Val Leu Asp Leu Ile Ala Leu Phe Pro Leu Tyr Asp Val
275 280 285

Arg Leu Tyr Pro Lys Glu Val Lys Thr Glu Leu Thr Arg Asp Val Leu
290 295 300

Thr Asp Pro Ile Val Gly Val Asn Asn Leu Arg Gly Tyr Gly Thr Thr
305 310 315 320

Phe Ser Asn Ile Glu Asn Tyr Ile Arg Lys Pro His Leu Phe Asp Tyr
325 330 335

Leu His Arg Ile Gln Phe His Thr Arg Phe Gln Pro Gly Tyr Tyr Gly
340 345 350

Asn Asp Ser Phe Asn Tyr Trp Ser Gly Asn Tyr Val Ser Thr Arg Pro
355 360 365

Ser Ile Gly Ser Asn Asp Ile Ile Thr Ser Pro Phe Tyr Gly Asn Lys
370 375 380

Ser Ser Glu Pro Val Gln Asn Leu Glu Phe Asn Gly Glu Lys Val Tyr
385 390 395 400

Arg Ala Val Ala Asn Thr Asn Leu Ala Val Trp Pro Ser Ala Val Tyr
405 410 415

Ser Gly Val Thr Lys Val Glu Phe Ser Gln Tyr Asn Asp Gln Thr Asp
420 425 430

Glu Ala Ser Thr Gln Thr Tyr Asp Ser Lys Arg Asn Val Gly Ala Val
435 440 445

Ser Trp Asp Ser Ile Asp Gln Leu Pro Pro Glu Thr Thr Asp Glu Pro
450 455 460

Leu Glu Lys Gly Tyr Ser His Gln Leu Asn Tyr Val Met Cys Phe Leu
465 470 475 480

Met Gln Gly Ser Arg Gly Thr Ile Pro Val Leu Thr Trp Thr His Lys
485 490 495

Ser Val Asp Phe Phe Asn Met Ile Asp Ser Lys Lys Ile Thr Gln Leu
500 505 510

Pro Leu Val Lys Ala Tyr Lys Leu Gln Ser Gly Ala Ser Val Val Ala
515 520 525

Gly Pro Arg Phe Thr Gly Gly Asp Ile Ile Gln Cys Thr Glu Asn Gly
530 535 540

Ser Ala Ala Thr Ile Tyr Val Thr Pro Asp Val Ser Tyr Ser Gln Lys
545 550 555 560

Tyr Arg Ala Arg Ile His Tyr Ala Ser Thr Ser Gln Ile Thr Phe Thr
565 570 575

Leu Ser Leu Asp Gly Ala Pro Phe Asn Gln Tyr Tyr Phe Asp Lys Thr
580 585 590

Ile Asn Lys Gly Asp Thr Leu Thr Tyr Asn Ser Phe Asn Leu Ala Ser
595 600 605

Phe Ser Thr Pro Phe Glu Leu Ser Gly Asn Asn Leu Gln Ile Gly Val
610 615 620

Thr Gly Leu Ser Ala Gly Asp Lys Val Tyr Ile Asp Lys Ile Glu Phe
625 630 635 640

Ile Pro Val Asn

<212> PRT
<213> Bacillus thuringiensis
<400> 3

Met Asn Pro Asn Asn Arg Ser Glu His Asp Thr Ile Lys Thr Thr
1 5 10 15

<210> 4
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Oligonucleotide

<220>
<221> misc_feature
<222> (9)..(9)
<223> N = A, C, G or T

<220>
<221> misc_feature
<222> (18)..(18)
<223> N = A, C, G or T

<220>
<221> misc_feature
<222> (21)..(21)
<223> N = A, C, G or T

<220>
<221> misc_feature
<222> (33)..(33)
<223> N = A, C, G or T

<220>
<221> misc_feature
<222> (42)..(42)
<223> N = A, C, G or T

<220>
<221> misc_feature
<222> (45)..(45)
<223> N = A, C, G or T

<400> 4
atgaatccna ataatcgntc ngtacatgtat acnattaaaa cnacn

<210> 5
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Oligonucleotide

<220>
<221> misc_feature
<222> (9)..(9)
<223> N = A, C, G or T

<220>
<221> misc_feature
<222> (33)..(33)
<223> N = A, C, G or T

<220>
<221> misc_feature
<222> (42)..(42)
<223> N = A, C, G or T

<220>
<221> misc_feature
<222> (45)..(45)
<223> N = A, C, G or T

<400> 5
atgaaccnacaacagaag tgagcacgac acnatcaaga cnacn

45

<210> 6
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Oligonucleotide

<220>
<221> misc_feature
<222> (9)..(9)
<223> N = A, C, G or T

<220>
<221> misc_feature
<222> (33)..(33)

<223> N = A, C, G or T

<220>
<221> misc_feature
<222> (42)..(42)
<223> N = A, C, G or T

<220>
<221> misc_feature
<222> (45)..(45)
<223> N = A, C, G or T

<400> 6
atgaatccna ataatcggtc cgaacatgat acnataaaaa cnacn

45

<210> 7
<211> 17
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Oligonucleotide

<220>
<221> misc_feature
<222> (9)..(9)
<223> N = Any nucleotide

<220>
<221> misc_feature
<222> (6)..(6)
<223> Y = C or T

<220>
<221> misc_feature
<222> (12)..(12)
<223> Y = C or T

<220>
<221> misc_feature
<222> (15)..(15)
<223> Y = C or T

<400> 7
atgaayccna ayaaycg

17

<210> 8
<211> 17
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Oligonucleotide

<220>
<221> misc_feature
<222> (3)..(3)
<223> R = A or G

<220>
<221> misc_feature
<222> (6)..(6)
<223> Y = C or T

<220>
<221> misc_feature
<222> (9)..(9)
<223> Y = C or T

<220>
<221> misc_feature
<222> (12)..(12)
<223> R = A or G

<220>
<221> misc_feature
<222> (15)..(15)
<223> H = A or C or T

<400> 8
garcaygaya crathaa

17

<210> 9
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Chimeric toxin gene

<400> 9
ggaacaatcc cagtgttag tagtagcta gccagatctt tattt

45

<210> 10
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Chimeric toxin gene

<400> 10
aaataaaagat ctggctagct acctactaaa cactgggatt gttcc 45

<210> 11
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Chimeric toxin

<400> 11
Gly Thr Ile Pro Val Phe Ser Arg Leu Ala Arg Ser Leu Phe
1 5 10

<210> 12
<211> 44
<212> DNA
<213> Artificial Sequence

<220>
<223> Chimeric toxin gene

<400> 12
ttacaggcgg agatttagtag gtagctagcc agatctttat ttcc 44

<210> 13
<211> 44
<212> DNA
<213> Artificial Sequence

<220>
<223> Chimeric toxin gene

<400> 13
gaaaataaaag atctggctag ctacctacta atctccgcct gtaa 44

<210> 14
<211> 12
<212> PRT
<213> Artificial Sequence

<220>

<223> Chimeric toxin

<400> 14

Thr Gly Gly Asp Val Ala Ser Gln Ile Phe Ile Phe
1 5 10

<210> 15

<211> 45

<212> DNA

<213> Artificial Sequence

<220>

<223> Chimeric toxin gene

<400> 15

ctcagtttag acggggctag tagtagcta gccagatctt tattt

45

<210> 16

<211> 45

<212> DNA

<213> Artificial Sequence

<220>

<223> Chimeric toxin gene

<400> 16

aaataaaagat ctggctagct acctactagc cccgtctaaa ctgag

45

<210> 17

<211> 14

<212> PRT

<213> Artificial Sequence

<220>

<223> Chimeric toxin

<400> 17

Leu Ser Leu Asp Gly Ala Ser Arg Leu Ala Arg Ser Leu Phe
1 5 10

<210> 18

<211> 52

<212> DNA

<213> Artificial Sequence

<220>

<223> Chimeric toxin gene

<400> 18
gtttatatac acaaaattga attttagtagg tagctagcca gatctttatt tt 52

<210> 19
<211> 52
<212> DNA
<213> Artificial Sequence

<220>
<223> Chimeric toxin gene

<400> 19
aaaataaaaga tctggcttagc tacctactaa attcaatttt gtcttatataa ac 52

<210> 20
<211> 16
<212> PRT
<213> Artificial Sequence

<220>
<223> Chimeric toxin

<400> 20

Val Tyr Ile Asp Lys Ile Glu Phe Ser Arg Leu Ala Arg Ser Leu Phe
1 5 10 15

<210> 21
<211> 37
<212> DNA
<213> Artificial Sequence

<220>
<223> Chimeric toxin gene

<400> 21
tataaagagt ttttaagaat aactgcagat aataata 37

<210> 22
<211> 37
<212> DNA
<213> Artificial Sequence

<220>
<223> Chimeric toxin gene

<400> 22
tattattatac tgcatgttatt cttaaaaaact ctttata 37

<210> 23
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
<223> Chimeric toxin

<400> 23

Tyr Lys Glu Phe Leu Arg Ile Thr Ala Asp Asn Asn Thr
1 5 10

<210> 24
<211> 41
<212> DNA
<213> Artificial Sequence

<220>
<223> Chimeric toxin gene

<400> 24
ccatggatgc agataataat acggaagcac tagatagctc t

41

<210> 25
<211> 41
<212> DNA
<213> Artificial Sequence

<220>
<223> Chimeric toxin gene

<400> 25
agagctatct agtgcttccg tattattatc tgcatccatg g

41

<210> 26
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
<223> Chimeric toxin

<400> 26

Met Asp Ala Asp Asn Asn Thr Glu Ala Leu Asp Ser Ser
1 5 10

<210> 27
<211> 41

Molecular Biology

<212> DNA
<213> Artificial Sequence

<220>
<223> Chimeric toxin gene

<400> 27
ccatgctagg agtagtaggt ttcccgttt g 41

<210> 28
<211> 41
<212> DNA
<213> Artificial Sequence

<220>
<223> Chimeric toxin gene

<400> 28
caagcgctcc acaaacggga aacctactac tccttagcatg g 41

<210> 29
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
<223> Chimeric toxin

<400> 29
Met Leu Gly Val Val Gly Phe Pro Phe Val Glu Arg Leu
1 5 10

<210> 30
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> Chimeric toxin gene

<400> 30
ccatggcaat ttggccaagt gaagac 26

<210> 31
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> Chimeric toxin gene

<400> 31
gtcttcactt ggccaaattg ccatgg

26

<210> 32
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Chimeric toxin

<400> 32

Met Ala Ile Trp Pro Ser Glu Asp
1 5

<210> 33
<211> 661
<212> DNA
<213> Artificial Sequence

<220>
<223> Recombinant Cauliflower Mosaic Viral Promoter (CaMV35S)

<400> 33
aagcttgcac gcctgcagg ctggatgtgag actttcaac aaaggtaat atccggaaac 60
ctcctcgat tccattgccc agctatctgt cactttattg tgaagatagt ggaaaaggaa 120
ggtggttcct acaaattgccca tcattgcgt aaaggaaagg ccattgttga agatgcctct 180
ggcgacagt gtcggaaaga tggaccccca cccacgagga gcatcgttga aaaagaagac 240
gttccaacca cgtttcaaa gcaagtggat tgatgtgatg gtccgtatgt agactttca 300
acaaaggta atatccggaa acctcctcgat attccattgc ccagctatct gtcactttat 360
tgtgaagata gtggaaaagg aaggtggctc ctacaaatgc catcattgcg ataaaggaaa 420
ggccatcgat gaagatgcct ctggcgacag tggccaaat gatggacccc cacccacgag 480
gagcatcgat gaaaaagaag acgttccaaac cacgtttca aagcaagtgg attgtatgtga 540
tatctccact gacgttgggg atgacgcaca atcccactat cttcgcaag acccttcctc 600
tatataagga agttcatttc atttggagag gacacgctga caagctgact ctagcagatc 660
t 661

<210> 34
<211> 19
<212> PRT

<213> Bacillus thuringiensis

<220>

<221> MISC_FEATURE

<222> (2)..(2)

<223> Xaa = Any

<220>

<221> MISC_FEATURE

<222> (4)..(4)

<223> Xaa = Any

<400> 34

Met Xaa Pro Xaa Thr Arg Ala Leu Asp Asp Thr Ile Lys Lys Asp Val
1 5 10 15

Ile Gln Lys

<210> 35

<211> 17

<212> DNA

<213> Artificial Sequence

<220>

<223> Synthetic Oligonucleotide

<400> 35

tgaacatgg tagttgg

17

<210> 36

<211> 17

<212> DNA

<213> Artificial Sequence

<220>

<223> Synthetic Oligonucleotide

<400> 36

taggtgatct ctaggcg

17

<210> 37

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Synthetic Oligonucleotide

<400> 37
ggaacaacct tctctaata

20

<210> 38
<211> 17
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Oligonucleotide

<220>
<221> misc_feature
<222> (6)..(6)
<223> Y = C or T

<220>
<221> misc_feature
<222> (12)..(12)
<223> Y = C or T

<220>
<221> misc_feature
<222> (9)..(9)
<223> N = A, C, G or T

<220>
<221> misc_feature
<222> (15)..(15)
<223> Y = C or T

<400> 38
atgaayccna ayaaycga

17

<210> 39
<211> 17
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Oligonucleotide

<220>
<221> misc_feature
<222> (6)..(6)
<223> Y = C or T

<220>
<221> misc_feature
<222> (3)..(3)
<223> R = A or G

<220>
<221> misc_feature
<222> (15)..(15)
<223> H = A, C, or T

<220>
<221> misc_feature
<222> (9)..(9)
<223> Y = C or T

<220>
<221> misc_feature
<222> (12)..(12)
<223> Y = C or T

<400> 39
garcaygaya cyathaa

17

<210> 40
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Oligonucleotide

<400> 40
gattgttcgg atccatggtt cttcctccct

30

<210> 41
<211> 17
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Oligonucleotide

<400> 41
tagtaggtag ctagcca

17

<210> 42
<211> 21

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Oligonucleotide

<400> 42
gatctggctta gctacacctact a 21

<210> 43
<211> 35
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Oligonucleotide

<400> 43
cgtattatta tctgcatacca tggttcttcc tccct 35

<210> 44
<211> 35
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Oligonucleotide

<400> 44
attatttatct gcagtttatttc ttaaaaaactc tttat 35

<210> 45
<211> 38
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Oligonucleotide

<400> 45
tcacttggcc aaattgccat ggtatttaaa aagtttgt 38

<210> 46
<211> 60
<212> DNA
<213> *Bacillus thuringiensis*
<400> 46
atgataagaa agggaggaag aaaaatgaat ccgaacaatc gaagtgaaca tgataacaata 60

<210> 47

<211> 12
<212> PRT
<213> Bacillus thuringiensis
<400> 47

Met Asn Pro Asn Asn Arg Ser Glu His Asp Thr Ile
1 5 10

<210> 48
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Oligonucleotide

<400> 48
cggattcatt ttagatcttc ctccctt

27

<210> 49
<211> 60
<212> DNA
<213> Bacillus thuringiensis
<400> 49

gtttatatag acaaaattga atttattcca gtgaattaaa ttaactagaa agtaaagaag 60

<210> 50
<211> 12
<212> PRT
<213> Bacillus thuringiensis
<400> 50

Val Tyr Ile Asp Lys Ile Glu Phe Ile Pro Val Asn
1 5 10

<210> 51
<211> 29
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Oligonucleotide

<400> 51
ctttctagtt aaagatcttt aattcactg

29

<210> 52
<211> 60
<212> DNA
<213> Bacillus thuringiensis
<400> 52

ccaaatccaa cactagaaga tttaaattat aaagagttt taagaatgac tgcagataat 60

<210> 53
<211> 20
<212> PRT
<213> Bacillus thuringiensis
<400> 53

Pro Asn Pro Thr Leu Glu Asp Leu Asn Tyr Lys Glu Phe Leu Arg Met
1 5 10 15

Thr Ala Asp Asn
20

<210> 54
<211> 34
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Oligonucleotide

<400> 54
atctgcagtc attgttagatc tctctttata attt

34